

**Improving Student Achievement in Computer Science:
A Pilot Program for Teachers at Northern Minnesota High Schools**

A Concept Paper from The College of St. Scholastica
July 22, 2013

Summary

This project will prepare regional teachers to teach Advanced Placement (AP) Computer Science Principles (CSP). St. Scholastica will develop and offer a summer graduate course in 2014 to six teachers from three districts and will provide ongoing mentoring. The course will focus on computer science content and pedagogy specific to teaching underrepresented groups. After these courses are piloted at three designated high schools, the project will be extended to cover additional schools in Minnesota.

Rationale

The National Association of Colleges and Employers (NACE) Job Outlook 2013 survey identified computer science as one of the five career fields in highest demand. This is particularly true in northeastern Minnesota, which is projected to have a 19.4 percent rate of growth in employment in mathematical and computer fields between 2010 and 2020, compared to 13.6 percent statewide. In fact, growing awareness of the need for more technology workers led to the development of the Northeast Minnesota STEM (Science, Technology, Engineering, Mathematics) Alliance in November 2012. The initial meeting attracted over 100 business, education, civic, and community leaders committed to improving STEM education and workforce development in Northeast Minnesota.

Despite awareness of this burgeoning need, no public high schools in our region currently offer Advanced Placement (AP) classes in computer science. In fact, Minnesota lacks a formal training and certification process for teachers in computing, meaning that many schools do not even offer a computer science course beyond Microsoft Office or Web Design. Moreover, a study by the Association for Computing Machinery (ACM) and the Computer Science Teachers Association (CSTA) found that computer science education is adopted into state education standards at a much lower rate in Minnesota than nationally (e.g., 10% rate of computer science adoption in Minnesota standards versus 29% nationally, in Grades 10-11). In order to develop the next generation of technology professionals, we need to introduce them to the exciting variety of computing at the high school level. This pilot project will prepare teachers to introduce students to computing and its potential as a career.

Project Goals

Our overall goal is to prepare teachers to introduce students to computing and its potential as a career, thereby developing the next generation of technology professionals. In order to do this, we seek to strengthen computer science curriculum and instruction in Duluth area high schools by offering AP Computer Science Principles in three districts, enrolling 60 students total.

Plan

- Develop a 3-credit graduate Education course that addresses content and pedagogy necessary to teach the AP CS Principles course.
 - Teachers enroll in one 3-credit graduate Education course during summer 2014 and then teach that course beginning in fall 2015 at their respective schools.
 - Host a summer workshop on campus to kick off each course and provide an opportunity to develop community among participating teachers and college faculty. The courses will continue online throughout each summer.
 - While offering the courses at their high schools, the teachers will be mentored by a CSS faculty member who visits their classroom, offering feedback on teaching methodologies and student engagement strategies.
-